

These submissions are made on behalf of the Victorian Planning and Environment Law Association (VPELA) in response to Family First Party (Senator Fielding) request that the following matter be referred to a Community Affairs Reference Committee for inquiry and report by 30 April 2011:

The social and economic impacts of rural wind farms, and in particular:

- (a) Any adverse health effects for people living in close proximity to wind farms;*
- (b) Concerns over the excessive noise and vibrations emitted by wind farms, which are in close proximity to people's homes;*
- (c) The impact of rural wind farms on property values, employment opportunities and farm income;*
- (d) The interface between Commonwealth, state and local planning laws as they pertain to wind farms; and*
- (e) Any other relevant matters.*

As a background to this submission, a brief description of VPELA is provided.

VPELA is a diverse not for profit professional association with a membership exceeding 950. It is the peak multi-disciplinary body in Victoria, which confers on matters of interest pertinent to land use planning, as well as the environment, planning law and urban design. It's membership is drawn from all disciplines related to planning and land use and include:

- Architects
- Barristers
- Developers
- Engineers
- Environmental Scientists
- Landscape Architects
- Lawyers
- Local Government Officers
- Planners
- State Government Officers
- Surveyors
- Transport Planners
- Valuers

The primary purposes of VPELA are:

- (a) To facilitate liaison and communication between practitioners concerned with using legal and administrative processes to achieve planning and environmental objectives;
- (b) To promote environmental knowledge and awareness, and ethical and competent practice in the planning and environmental professions;
- (c) To promote understanding of the role of planning and environmental law in regulating and managing the conservation of and usage of the environment;

- (d) To contribute toward the resolution of problems relating to the administration, implementation and regulation of planning and environmental legislation;
- (e) To gather information and consider and make recommendations and submissions concerning any existing or proposed legislation or policies.

VPELA achieves the above primary purposes via a variety of means including:

- ★ Providing a forum to share views on planning and environmental issues;
- ★ Regular Newsletters, Bulletins and Seminars covering a diverse range of planning and environmental topics;
- ★ Providing a well recognised professional organisation through which views on planning and environmental issues can be focussed and disseminated.

In addressing the above grounds of inquiry, VPELA's submissions are broken into the following topics:

- (1) The Victorian Planning Process and its interaction with Commonwealth and State Laws pertaining to wind farms;
- (2) The Health Impact of wind farms; noise and vibrations;
- (3) The Social and Economic Impact of wind farms.

(1) Outline of the Victorian Planning Process and its interaction with Commonwealth and State Laws pertaining to Wind Farms

Victorian Planning Process

The assessment and approval of wind farms in Victoria is regulated through the planning system administered under the *Planning and Environment Act 1987* (Vic) (**PE Act**).

In most circumstances, a wind farm proposal in regional Victoria requires a planning permit to be issued by the responsible authority.

The identity of the responsible authority who decides the permit application depends upon the megawatt (**MW**) capacity of the wind farm. If the MW capacity of a proposed wind farm is less than 30 MW, the local Council is the responsible authority. If however the MW capacity of the wind farm is 30 MW or greater, the Minister for Planning is the responsible authority for deciding whether a planning permit should be issued.

Where wind farm applications are assessed by the local Council, the application is exhibited for public comment and there is a right to appeal the Council's determination to the Victorian Civil and Administrative Tribunal (VCAT). A right of appeal on a question of law is available to the Supreme Court of Victoria.

For wind farm planning permit applications determined by the Minister, a Planning Panel is usually convened under the PE Act to consider the application. The Planning Panel will consider submissions in relation to the wind farm proposal, hold hearings, and report on its recommendations to the Minister. The Minister may then determine to grant or refuse the planning permit application. There is no right of appeal from the Minister's determination.

If the wind farm proposal needs to be assessed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**), then under a bilateral agreement between the Commonwealth and the State of Victoria, the PE Act approval process may be accredited for the purposes of assessing EPBC Act matters. This maximises the efficiency of the assessment process, and minimises the likelihood of inconsistencies arising between Commonwealth and State processes.

In Victoria, the majority of wind farm proposals are considered by Planning Panels. In 2010, Planning Panel hearings were convened for 6 new wind farm proposals, and 1 case was heard by VCAT. Planning Panel hearings vary in length according to the number of issues and submissions for the Planning Panel to consider. Of the Planning Panel hearings held in 2010, the hearings ranged in duration from 1 ½ weeks to 6 weeks.

Public Participation

Both the Planning Panel and the VCAT processes allow for stakeholders – including the proponent, various government bodies (such as the local Council, Department for Planning and Community Development, Department of Sustainability and Environment, the CFA and VicRoads), local residents and other interested parties – to make submissions and presentations on the proposal. Where expert evidence is presented, cross-examination is typically allowed.

These processes enable a wide range of issues relating to the wind farm proposals to be addressed, and their impacts assessed. These matters invariably include – to differing degrees – the impacts of wind farms that are the subject of the Senate Inquiry, and are addressed in the following sections of this submission.

In VPELA's opinion, the Victorian processes are open and transparent and satisfactorily allow, and encourage, public participation. For example, it is evident from a review of the Planning Panel hearings conducted in 2010, all of the matters raised by this Senate Inquiry received considerable

attention in the Planning Panel's reports to the Minister. In our opinion, this shows that a comprehensive assessment of the proposal informed the Minister's determination.

Victorian Planning Policy

Any planning permit application has to be assessed against relevant State and Local planning policies. These planning policies deal with the full gamut of environmental, social and economic issues which any new development may have to address. In assessing the planning merits of a proposal, the ultimate objective is to establish whether the proposal, based on the policy assessment, will deliver a 'net community benefit'.

With this in mind, there are three aspects of Victorian planning policy which are particularly relevant to consideration of wind farm applications.

State Planning Policy

First, State planning policy contained within the relevant Planning Schemes strongly supports the development of renewable energy in Victoria provided other ecological, noise, shadow flicker and other impacts are acceptable.

Clause 19.01 seeks to "promote the provision of renewable energy in a manner that ensures appropriate siting and design considerations are met" and provides:

In planning for wind energy facilities:

- *Facilitate the consideration of wind energy development proposals.*
- *Recognise that economically viable wind energy facilities are dependent on locations with consistently strong winds over the year and that such sites may be highly localised.*

The policy then requires that decision makers must consider *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria* (Sustainable Energy Authority Victoria, September 2009) and *Renewable Energy Action Plan* (Department of Sustainability and Environment, July 2006), in considering proposals for renewable energy.

Victorian Wind Energy Guidelines (September 2009)

Secondly, the *Victorian Wind Energy Guidelines (September 2009)* are applicable and set objective performance criteria for noise and shadow flicker, and also provide guidelines for assessing ecological, landscape and other impacts. These Guidelines have provided a consistent approach to the

development of wind farms since 2002 and ensure that renewable energy policy and technical assessment criteria are up to date.

The Guidelines outline:

- the Government’s renewable energy policy;
- the role of wind energy projects in achieving a sustainable energy future for Victoria;
- the State assessment mechanism for wind energy projects of 30MW or greater; and
- a planning framework for the consideration of all wind energy projects which will ensure a consistent and balanced approach to assessment across the State.

The Guidelines are an ‘Incorporated Document’ under the Victorian Planning Scheme and must be taken into account by responsible authorities in decision-making.

Clause 52.32 Wind Energy Facility

Thirdly, Clause 52.32 Wind Energy Facility is contained within every Victorian planning scheme. This clause also reaffirms planning policy support for wind farms, sets out the information that must be included in planning permit applications, and includes decision guidelines to which regard must be had in deciding whether a planning permit should be issued.

The purpose of Clause 52.32 is to:

“To facilitate the establishment and expansion of wind energy facilities, in appropriate locations, with minimal impact on the amenity of the area.”

Clause 52.32 stipulates wind farms require a planning permit and details the scope of studies required when lodging a planning application. Under Clause 52.32, the assessment of a wind farm must take into account a number of other Commonwealth or State Acts, including:

- The visual impact on abutting land that is subject to the *National Parks Act 1975*.
- The impact of the proposal on any species (including birds and bats) listed under the Victorian *Flora and Fauna Guarantee Act 1988* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999).
- The noise impacts of the proposal on existing dwellings prepared in accordance with the *New Zealand Standard NZ6808:1998, Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators*

Clause 52.32 also details the decision guidelines, against which the responsible authority must consider an application. These are:

- The effect of the proposal on the surrounding area in terms of noise, blade glint, shadow flicker and electromagnetic interference.
- The impact of the development on significant views, including visual corridors and sightlines.
- The impact of the facility on the natural environment and natural systems.
- The impact of the facility on cultural heritage.
- The impact of the facility on aircraft safety.
- The Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, 2009.

Interaction with other Victorian Acts

Environment Effects Act 1978

The Minister for Planning is responsible for administering the *Environmental Effects Act 1978* and for deciding whether an Environmental Effects Statement (EES) is required under this Act.

If a proposal is likely to have a significant effect on the environment, it should be referred to the Minister for a decision on the need for an EES. The referral guidelines in the Ministerial guidelines for assessment of environmental effects under the *Environmental Effects Act 1978* provide guidance on EES processes.

Generally, wind farms are not required to undertake a EES as historically the Minister has been of the opinion that the potential environmental effects of the project can be adequately assessed through the planning permit process (and in particular the planning panel process detailed above) under the PE Act.

National Parks Act 1975

Wind farms are excluded from land reserved under the *National Parks Act*. The Victorian Government's Policy and planning guidelines for development of wind farms in Victoria notes that excluding National Parks, excludes wind farms from approximately 43 per cent of the length of Victoria's coastline, and from approximately 32 per cent of the area within 1km of the coast.

The exclusion of wind farms from National Parks is widely supported by all stakeholders.

Victorian Flora and Fauna Guarantee Act 1988

The primary legislation for the protection of flora and fauna in Victoria is the *Flora and Fauna Guarantee Act 1988 (FFG Act)*. The Act builds on broader national and international policy in the conservation of biodiversity.

The broad objectives of the FFG Act are to:

1. ensure native flora and fauna survive, flourish and maintain *in situ* evolutionary potential;
2. manage threatening processes;
3. encourage the conservation of flora and fauna through cooperative community endeavours;
and,
4. establish a regulatory structure for the conservation of flora and fauna in Victoria.

The FFG Act contains protection procedures such as the listing of threatened species and/or communities of flora and fauna, and the preparation of action statements to protect the long-term viability of these values. Ecological communities and species located within the study area or predicted to occur within the study area are discussed below.

The FFG Act applies to the development of wind farms where there are known or potential impacts to matters listed under the Act, and where these matters exist on public land. With the exception of the determination of ‘critical habitat’ defined under the FFG Act, the Act is not applicable to proposed wind farms located on private property. Accordingly, the development can proceed on private property without formal approval under the Act.

Interaction with Commonwealth Acts

Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) establishes a Commonwealth process for assessment of proposed actions that are likely to have a significant impact on matters of National Environmental Significance (NES), or on Commonwealth land. An action (i.e., project, development, undertaking, activity, or series of activities), unless otherwise exempt, requires approval from the Australian Government’s Environment Minister if they are likely to have an impact on any matters of NES. For proposed wind farm developments a referral under the EPBC Act is required if a proposed action is likely to have a ‘significant impact’ on any of the following matters of NES:

- World Heritage properties
- National Heritage places
- Nationally protected wetlands (Ramsar wetlands);
- Nationally listed threatened species and ecological communities;
- Listed migratory bird species;
- Nuclear activities (including uranium mines);
- Commonwealth marine areas; and
- The Great Barrier Reef Marine Park.

The EPBC Act is Commonwealth legislation that is robust to assess the impacts of wind farms on matters of NES.

EPHC Draft National Wind Farm Guidelines, July 2010

The Environment Protection and Heritage Council of Australia and New Zealand (EPHC) has published *Draft National Wind Farm Guidelines* (Draft EPHC Guidelines). The purpose of the Draft EPHC Guidelines is to provide a nationally consistent set of best-practice methods for assessing the impacts that are unique or significant to wind farm developments and operations. The Draft EPHC Guidelines addresses:

- Community and stakeholder consultation.
- Wind turbine noise.
- Visual and landscape impacts.
- Birds & bats.
- Shadow flicker.
- Electromagnetic interference (EMI).

Under the Victorian Planning Scheme, the Draft EPHC Guidelines are not a statutory consideration when determining a planning application and as such are not afforded weight when a planning application is assessed. Therefore, the interface between the planning and approvals of a wind farm with the Draft EPHC Guidelines is limited. Submissions in relation to these and other guidelines do, however, occupy considerable time during hearings which because of the status of the guidelines, is usually an unproductive exercise.

It is noted that the Draft EPHC Guidelines do not contain uniform noise limits across all Australian jurisdictions. VPELA considers that a national noise standard for wind farm's would provide consistency, allow best practice measures to be established and provide a level of certainty for wind farm developers, operators, local enforcement agencies and the community.

Emerging Victorian Policy

It is noted that the election of Liberal National Coalition on 27th November 2010 may modify the assessment framework for wind farms. At the time of writing this submission no formal policy amendments have been tabled by the Liberal National Coalition. However, the following policy statements have been made:

- *“the placement of turbines no less than two km from the nearest home unless a contract between the resident and wind farm developer is agreed;*
- *the reinstatement of local government as the planning authority for wind farm applications;*
- *the establishment of a shared payment system for landowners whose properties are within one km of the nearest turbine, as a compensation mechanism for adjacent landholders.”*

Whilst the broad social and economic impacts are addressed under the other terms of reference, specific to the implementation of the above policy positions, VPELA does have concerns that such policies would establish a number of precedents, including:

- requiring neighbouring properties to a development to enter into some form of contract or agreement in order for a planning permit to be secured;
- requiring a payment system to neighbouring properties;
- mandating prescribed arbitrary buffers between certain land uses where the buffer is not premeditated on scientific grounds.

VPELA is not aware of any research that has been undertaken to determine the impact of the two kilometer buffer in terms of whether any wind farms could be designed in Victoria to meet this provision.

The establishment of such precedents is not supported by VPELA for any type of development.

With regards to the reinstatement of local government, the Council, as the responsible authority, VPELA notes that in Victoria there is currently a divide between the priorities and objectives of Councils and the state government. Councils are run to represent the community and as a result,

influence from the local community can affect decisions at a local level. For example, residents are generally opposed to major change within the community. On the other hand, policy at the Commonwealth or State level can be driven and respond to state wide and Commonwealth issues, such as meeting obligations under Commonwealths Large-scale Renewable Energy Target (LRET) (effective from January 2011).

It is also noted that a decision of the responsible authority, Council, may be reviewed by VCAT and pursuant to the PE Act and the Victorian Civil and Administrative Tribunal Act 1998, the Minister for Planning may "call in" a permit application or appeal before VCAT where the Minister considers that:

- the proceeding raises a major issue of policy; and
- the determination of the proceeding may have a substantial effect on the achievement or development of planning objectives

When this occurs, the Minister will frequently appoint a Planning Panel to consider the matter before his/her decision. This can be a lengthy process and add over 6 months before a decision is made. VPELA submits that it is in the interests of all parties that decision making not extend for long periods of time.

In summary, it is clear from the above the statutory and policy framework for the development of wind farms in Victoria is multi-layered and takes into account Commonwealth, State and Local planning policies. Generally, it is fair to say that wind farms are encouraged at a policy level with the decision maker required to assess the applications against State performance standards relating to the amenity impacts of wind farms on surrounding properties.

(2) The Health Impact of wind farms; noise and vibrations

Objectors to wind farms often cite low frequency sound¹ and/or infrasound² as the cause of alleged health issues, including headaches, nausea, sleep deprivation, stress and anxiety (sometimes referred to as 'wind turbine syndrome'³).

This has become a particularly topical issue since the much publicised media interest in the alleged infrasound emissions from the Waubra Wind Farm.

¹ Low frequency sound is usually regarded as sound within the 20 to 100 Hz range. It is audible but at the lower end of the audibility range.

² Infrasound is sound below 20Hz and is normally inaudible.

³ A term coined by Nina Pierpont MD, PhD, in her book, 'Wind Turbine Syndrome: A Report on a Natural Experiment' (2009).

At present, there is no evidence linking wind farms, and in particular wind farm noise, with direct adverse health effects. It should be noted, however, that such evidence as is currently available, is limited and cannot disprove such a link.

Wind Farm Noise - Overview

Modern wind turbine designs emit noise levels which vary with wind speed. When the wind is very light the turbines will be stationary or operate at a low power output and therefore produce little noise.

As wind speeds increase, the noise emitted by the turbines progressively increases. Once the turbines are generating at or near to their maximum power output, modern turbines generally do not increase their sound output any further. In most rural environments, the background noise will also increase with wind speed (for example, as a result of effects such as wind disturbance of vegetation and air movement around buildings). However it is also noted that there can be differential noise levels at a wind farm and a receiving property due to other factors such as topographical or meteorological factors.

Policies on wind farm noise in Australia vary from state to state. Common to each state is the adoption of policies which require the noise at surrounding dwellings to be restricted to suitably low noise levels. The intention of these policies is to provide a consistent level of protection for neighbouring residents both inside and outside of a dwelling. This type of approach is consistent with environmental noise criteria throughout Australia for all types of noise sources which tend to focus on objective limit values, rather than arbitrary separating distances which do not provide any assurance of an acceptable noise level being achieved.

In very general terms, a modern wind farm that is designed to comply with Australian state policies will typically be limited to noise levels between 35 and 45dB⁴ at the nearest surrounding dwellings. Noise limits are normally set at some minimum fixed value for the protection of amenity under relatively calm conditions, and only then permitted to be increased when background noise levels are sufficiently high as a result of factors such as wind disturbed vegetation. These noise limits are relatively low when compared to the magnitude of limits applied to other forms of national infrastructure such as transportation. For comparison, the following table provides examples of typical noise level ranges associated with different environments and activities.

Noise Level Range dB	Example / Description
0	Threshold of hearing

⁴ Decibels measured with an A-weighting to reflect the characteristics of human hearing

10-20	Recording Studio Inside a quiet bedroom in a rural area remote from major roads
20-30	Outside in a very quiet rural area in very still conditions remote from major roads Inside a bedroom at night in a quiet suburban area
30-40	Outside in a quiet rural area in relatively calm conditions. Inside a quiet library area or private office
40-50	Outside during the day in a quiet suburban area Outside in a quiet rural area during moderately windy conditions
50-60	Outside during the day in a suburban area up to 1000m from of a major arterial road. Inside an open plan office environment. Quiet conversational voice levels
60-70	Raised conversation voice levels Inside a relatively busy restaurant environment Inside the cabin of a typical medium to large size passenger jet aircraft
70-80	Average level within 20 to 30m of a busy dual carriage way
80-90	Inside a performance venue with low level amplified music
90-100	Inside a performance venue with live music. Inside a noisy industrial environment where hearing protection is required

Whilst wind farms are required to achieve stringent criteria at neighbouring dwellings, the noise of a wind farm may still be audible on occasion at some the closest residential properties. This will be highly dependent on a number of factors, such as the distance between a dwelling and the nearest turbines, and the amount of noise from other sources, such as road traffic and natural wind generated background sounds etc. Even at locations where wind farm noise can be occasionally heard, it is important to note that this only occurs for a portion of the time under certain wind speeds and directions. The greatest chance of hearing a wind farm is when the wind is blowing directly from the turbines towards the house. In contrast, when the wind is blowing from the house towards the turbines, the sound level is greatly reduced and it is much less likely that the wind farm could be heard.

It is noted that whilst applicable guidelines require that background noise monitoring be averaged over a 24 hour period, in practice however, Planning Panels routinely require that background noise monitoring for receivers to be done both during the day and at the night and the results separated.

The subjective nature of human response to sound is such that any level of audible noise carries some residual risk of disturbing an individual. This risk will depend on a wide range of variables related to the noise in question and an individual's perception of the noise. Given the extent of these variables (particularly the variable hearing sensitivity of individual members of the community), and the need for the planning policy system to balance the need for renewable energy development with the protection of the community, a policy of inaudibility is not practical. This is consistent with aim of noise protection policies in Australia which are focused on limiting noise impacts.

Community Noise Concerns

There are currently 52 wind farms⁵ operating in Australia comprising over 1000 turbines. In some instances, wind farm noise has given rise to disturbance of neighbouring residents.

Statistical data on community attitudes to noise levels around Australian wind farms is not available, however the relatively limited portion of sites which appear to attract complaint tends to support that existing policies provide a reasonable level of protection for the majority of residents living near modern wind farm developments. This is supported by studies in the UK which have shown that the use of noise criteria similar to the approaches adopted in Australia has enabled the majority of wind farms to operate without reported noise disturbance to neighbouring residents.

In the early days of wind farm development, much of the attention relating to noise was caused by features which are no longer present in modern wind turbine designs. For example, technological improvements in gearbox insulation, blade design and speed regulation have all led to dramatically reduced noise emissions and improved sound characteristics. These improvements are now common features of modern wind farm developments. Reaction to noise will always vary from person to person, no matter how quiet or infrequent. However, the improvements of modern turbine design, combined with the low noise levels that wind farms are required to be designed to, mean that the majority of individuals are unlikely to experience noise disturbance.

As part of the normal permitting process applied to most wind farm developments, post-construction noise monitoring at surrounding dwellings is normally required to demonstrate that a site has achieved compliance with the noise limits. This type of compliance monitoring may also be instigated in response to specific community concerns. Importantly, this type of testing is an integral element of noise management policy in Australia by enabling any compliance breaches which may prove cause for complaint to be identified and rectified. For example, this type of testing may identify machine

⁵ Clean Energy Council, February 2011

defects which must be remedied, or a broader requirement for a noise management scheme based on reducing turbine speeds under critical wind speeds and directions.

Infrasound, Low Frequency Noise, Vibration & Amplitude Modulation

In common with many other sources of noise, wind turbines emit low levels of infrasound, low-frequency sound and ground vibrations. These types of sound and vibration are a feature of the everyday environment in which we live. For example infrasound and low-frequency sound is produced by regularly encountered natural and man-made sources, such as the infrasound produced by the wind or distant traffic. In relation to wind turbines, the levels of these types of emissions are extremely low and, in most cases, cannot be reliably measured amidst normal background levels.

Considerations relating to infrasound, low-frequency sound and vibration are real matters for environmental noise assessment, particularly for large scale industrial complexes involving combustion plant. However, the overwhelming consensus, demonstrated by measurements made at numerous wind farms in Australia and around the world, is that wind turbines emit such low levels of these emissions that they do not pose a risk in terms of direct health effects.

For example, a co-author of the World Health Organisation *Guidelines for Community Noise* (1995) observed that there 'is no reliable evidence that infrasound below the hearing threshold produced physiological or psychological effects'.⁶

Further, the New Zealand Standard 6808:2010 *Acoustics - Wind farm noise* states that any inaudible sound (either ultrasound or infrasound) emitted from wind turbines 'will be well below the threshold of human perception', and the South Australian Environment Protection Authority Wind Farm Guidelines also note that the EPA is not aware of infrasound being present at any modern wind farm site.⁷

Other reported effects of modern wind farm noise relate to an effect known as amplitude modulation which relates to the rhythmic rise and fall in the level of noise associated with a wind farm, over and above the normal variation in noise associated with a wind farm. Despite considerable attention to this subject in recent years, little evidence currently exists to confirm the presence of this type of effect, largely due to the very limited numbers of sites where the effect has been reported, and at the sites where it has been reported, the limited and very specific atmospheric conditions required to result in the reported effect. In recognition of the very limited apparent extent of this reported matter, the subject of amplitude modulation has not altered the general view that current noise policies continue

⁶ B Berglund & Lindvall T (1995), 'Community Noise', *Archives of the Center for Sensory Research*, 2(1).

⁷ South Australian Environment Protection Authority, 'Wind farms environmental noise guidelines', page 15, available at: http://www.epa.sa.gov.au/xstd_files/Noise/Guideline/windfarms.pdf

to represent suitable planning tools on the basis that they provide an appropriate level of protection from noise for the majority of people at the majority of wind farm sites.

International and Australian studies/reviews into health effects

There is currently no evidence directly linking low frequency sound emissions at the levels produced by wind farms, to adverse health impacts.

The American and Canadian Wind Energy Associations commissioned a panel of experts to review the available literature relating to the health effects from wind turbine noise.⁸ The panel concluded that:

- a) sound from wind turbines does not pose a risk of hearing loss or any other adverse health effect in humans;
- b) subaudible, low frequency sound and infrasound from wind turbines do not present a risk to human health;
- c) some people may be annoyed at the presence of sound from wind turbines. The noise is not a pathological entity; and
- d) a major cause of concern about wind turbine sound is its fluctuating nature. Some may find this annoying, a reaction that depends primarily on personal characteristics as opposed to the intensity of the sound level.

Similar conclusions have been reached by Australian authorities and peak bodies.

WorkSafe Victoria was queried by the Berrybank Wind Farm Planning Panel regarding the health effects of wind farms. WorkSafe submitted in a letter to the Panel:

WorkSafe Victoria has met with other government agencies regarding the possible health effects of wind energy facilities.

The Victorian Department of Health (DH) has examined both the peer-reviewed and validated scientific research and also looked at the health aspects of the current planning process.

The DH has determined that the weight of evidence indicates that there are no direct health effects from noise (audible and inaudible) at the levels generated by modern wind turbines. Numerous international reviews on low frequency and infrasound noise, and case studies of actual wind farm noise emissions, have demonstrated that:

- *There is insignificant infrasound generated from modern wind turbines; and*

⁸ *Wind Turbine Sound and Health Effects: An Expert Panel Review*, prepared for American Wind Energy Association and Canadian Wind Energy Association, December 2009, available at http://www.canwea.ca/pdf/talkwind/Wind_Turbine_Sound_and_Health_Effects.pdf

- *Levels of low frequency a level that would lead to direct health effects.’*

The National Health and Medical Research Council (NHMRC) has issued a document titled ‘*Wind Turbines and Health – a Rapid Review of the Evidence*’ dated July 2010. In this document the Council reviewed scientific literature on a range of potential health effects associated with the operation of wind farms, including noise, and concluded that ‘there are not direct pathological effects from wind farms and that any potential impact on sound emitted from modern wind turbines are not at humans can be minimised by following existing planning guidelines’⁹. However, NHMRC also stated that:

While there is currently no evidence linking these phenomena with adverse health effects, the evidence is limited.

Therefore it is recommended that relevant authorities take a precautionary approach and continue to monitor research outcomes.

How have panels and VCAT approached complaints about potential health impacts

VCAT and Planning Panels and/or advisory committees have acknowledged that noise from wind farms can be annoying, and it follows that in some cases such annoyance can lead to health impacts such as sleep disturbance, headaches and the like. However, based on the information presented to them, there is no clear evidence demonstrating a direct relationship between the operations of wind farms and health concerns.¹⁰ Planning Panels and VCAT have therefore based their decisions on the objective criteria contained in the Wind Energy Guidelines.

This approach is not only reasonable, but supported by a large body of planning law which is to the effect that Standards and Guidelines should be applied, not critiqued, by responsible authorities and appellate court and tribunals when they are called upon to assess the merit of planning permit applications¹¹.

Notwithstanding this, panels and advisory committees have noted that no detailed research has been undertaken by an independent and accredited research body into the health effects of wind farms. While there is no published positive evidence that links direct health effects to wind farms, nor any evidence of health effects arising at such low levels from any other type of noise source, there is similarly no independent published evidence that establishes or leads to the reverse conclusion.¹²

⁹ NHMRC, ‘Wind Turbines and Health – a Rapid Review of the Evidence’ (July 2010), page 2, available at http://www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/evidence_review__wind_turbines_and_health.pdf

¹⁰ See for example: Stockyard Hill Wind Farm: Panel Report, August 2010, page 257; Yaloak South Wind Energy Facility: Advisory Committee Report, September 2010, page 207; Moorabool Wind Energy Facility: Panel Report, September 2010, page 188; *Acciona Energy Oceania Pty Ltd -v- Corangamite Shire Council* [2008] VCAT 1617 (11 August 2008).

¹¹ *Doncaster Road Property Partnership v Manninghamman CC* [2004] VCAT 2445

¹² Moorabool Wind Energy Facility: Panel Report, September 2010, page 188.

On this basis, a number of panels have recommended that further, more detailed research into the issue should be undertaken by an independent appropriately accredited research body.¹³

What needs to be done?

When considering how VCAT and Planning Panels have treated alleged health effects, it is important to bear in mind that almost all of the objectors to those wind farm proposals cited alleged health effects associated with a single operating wind farm in Victoria. No evidence from other adjoining landholder or community members from the other 6 operating wind farms in Victoria – or the other 20-odd wind farms throughout the country – were called in support of those complaints.

It could be inferred from this that communities and residents living in the vicinity of most wind farms are habituating to their presence, and are not suffering adverse amenity or health consequences. VPELA understands that that is also the experience of most wind farm operators throughout Australia.

Nevertheless, VPELA believes it would be desirable for an independent epidemiological study to be carried out on proposed and operating wind farms to try and give the wind energy industry, regulators and the community a greater insight into these issues and – through this – confidence in the planning system. This would provide a valuable contribution to the advice provided on this issue by the Victorian Department of Health and the National Health and Medical Research Council. Further, whilst there does not appear to be evidence suggesting a requirement to modify existing assessment practices or to delay wind farm development, further work in this area would make a valuable contribution to any future policy review, and should be monitored as a matter of course.

(3) The Social and Economic Impact of wind farms

Introduction

Wind farms are substantial projects that result in environmental, social and economic change. While different people might have different perspectives of whether these changes are positive or negative, the Victorian planning system includes a process and guidelines to enable an objective assessment of the planning merit of wind farm proposals to be carried out.

The key to deciding whether a new project should be approved is whether it will achieve a ‘net community benefit’. This means that the environmental, social and economic impacts of the proposal need to be evaluated, and weighed-up, before a decision is made on whether it should be approved.

¹³ Stockyard Hill Wind Farm: Panel Report, August 2010, page 257; Yaloak South Wind Energy Facility: Advisory Committee Report, September 2010, page 207; Moorabool Wind Energy Facility: Panel Report, September 2010, page 188.

Social and economic impacts are evaluated by reference to impacts (positive and negative) on the local community, as well as the broader Victorian community.

There are very few differences between the local economic costs and benefits of wind farms described below, and other substantial infrastructure projects which are being developed in regional Victoria. However, wind farms also make very substantial contributions to reducing the effect of carbon-intensive electricity generation on the Victorian (and Australian environment), and thereby help us avoid the economic and social consequences of anthropogenic climate change. Planning policy in Victoria recognises and gives effect to this principle¹⁴.

Planning Panels and tribunals in Victoria have also acknowledged and considered the effect of wind farm projects on local communities. Again, in many respects the social effects of wind farms are the same as other water, transport and infrastructure projects in regional Victoria. This is particularly the case during the construction phase of the project. However, some planning panels have expressed a view that due to certain characteristics of wind farms, they enhance the potential for social division.

Economic costs and benefits

Construction and operation

Wind farms are typically worth several hundred millions of dollars, and can result in a large construction workforce being present in a local community over a period of up to one to two years. A substantial portion of the workforce is typically not local, which means that the construction of wind farm (and other) projects in regional Victoria make a relatively modest direct contribution to reducing local unemployment levels. There is also the potential for construction workforces to strain local services, which is a matter which proponents need to manage - in consultation with government – for all projects in regional Victoria, including wind farms.

Nevertheless, the presence of the construction workforce has a substantial economic upside for the local community. This ‘upside’ manifests itself in providing a source of business for accommodation providers, and other local businesses and services. This in turn creates wealth and local employment opportunity, at least for the short-mid term.

After the wind farms have been constructed and commenced operation, the economic benefits are less pronounced, but still significant. For example, it is not uncommon for the staff involved in managing and serving a wind farm to reside in the local community and the local wind farm would typically utilise local businesses to provide routine maintenance and upkeep services.

14 Clause 19.01 State Planning Policy Framework

Local government rates

The development and operation of a wind farm results in substantial rates which are paid by the wind farm operator to local councils. These council rates can be several hundred thousand dollars for each project.

It has sometimes been argued before Planning Panels and Tribunals that councils utilise much of this rate revenue in administering planning permissions for wind farms. Planning Panels have typically not involved themselves in these arguments, but there are two things that put these arguments into perspective:

- the typical wind farm life is 20-30 years, and rates are payable annually for the life of the project. By contrast, the administration of wind farm planning approvals is typically most intense in the period leading up to and during the construction of the project. Once it is operational, the ‘administration’ of the wind farm permit is much less intense; and
- there has over the last 12 months been ongoing discussions between the Victorian Government, the Municipal Association of Victoria, and local councils about which level of government should be responsible for administering and enforcing planning permits for wind farms. VPELA understands an announcement on this topic is expected soon, but there is a case for either the Victorian Government assuming this responsibility, or providing additional funding to regional councils so they can resource technical advice and expertise that is required.

While not a regulatory requirement, VPELA also notes that a number of wind farm operators routinely establish community funds from which the company contributes to local community facilities and services (such as local sporting clubs, land care, etc). These contributions are often done on the advice or input of local community leaders. While the more vociferous wind farm opponents have accused the wind energy industry of using these funds as ‘bribes’, their beneficial effect has been noted by some planning panels, and they undoubtedly offset – to some degree – the impact of wind farms on local communities.

Property Values

The effect of wind farms on property values is another area of concern often raised by parties. However, to date there is no definitive research from Australian or overseas that has produced concrete evidence that property values decrease as a result of the development of wind farms.

Most of the studies conducted acknowledge that the value of rural property is influenced by a large of factors including soil, ecology, climate, site access, subdivision potential, improvements, and agricultural productive capacity of the land. The impact of wind farms on the value of property,

whether within the view shed or not, did not appear to affect the value of the property in the long term.

For example, in a case study of land values near a wind farm in Crookwell, NSW, 2006, the authors conclude¹⁵:

“It is clear that the underlying agricultural productive capacity of the land subject to the wind farm and the surrounding property is not in any measured way affected by the development of the Crookwell wind farm meaning there has been no reduction in values. This would support the findings of the RICS perception survey of UK valuers, 72% of which believe that wind farm development has either no effect or had a positive impact on agricultural land values.

Indeed the property subject to the development enjoys additional revenue and has some added benefits from improved roads, erosion control and passive wind protection for stock from the sub stations and turbine tower structures.”

In a recent 2009 US study¹⁶, the authors conclude:

“The concern that property values will be adversely affected by wind energy facilities is commonly put forth by stakeholders. Although this concern is not unreasonable, given property value impacts that have been found near high voltage transmission lines and other electric generation facilities, the impacts of wind energy facilities on residential property values had not previously been investigated thoroughly. The present research collected data on almost 7,500 sales of single family homes situated within 10 miles of 24 existing wind facilities in nine different U.S. states.

The conclusions of the study are drawn from eight different hedonic pricing models, as well as both repeat sales and sales volume models. The various analyses are strongly consistent in that none of the models uncovers conclusive evidence of the existence of any widespread property value impacts that might be present in communities surrounding wind energy facilities.

Specifically, neither the view of the wind facilities nor the distance of the home to those facilities is found to have any consistent, measurable, and statistically significant effect on home sales prices. Although the analysis cannot dismiss the possibility that individual homes or small numbers of homes have been or could be negatively impacted, it finds that if these impacts do exist, they are either too small and/or too infrequent to result in any widespread, statistically observable impact.”

In 2009, an assessment on the impact of wind farms on property values was prepared for the NSW Valuer General.¹⁷ This paper concludes that:

15 Land Value Impact of Wind Farm Development, Crookwell New South Wales, February 2006, Henderson & Horning Pty Ltd

16 The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis, Prepared for the Office of Energy Efficiency and Renewable Energy Wind & Hydropower Technologies Program, U.S. Department of Energy, December 2009

“The main finding was that the wind farms do not appear to have negatively affected property values in most cases. Forty (40) of the 45 sales investigated did not show any reductions in value. Five (5) properties were found to have lower than expected sale prices (based on a statistical analysis). While these small number of price reductions correlate with the construction of a wind farm further work is needed to confirm the extent to which these were due to the wind farm or if other factors may have been involved.”

Despite the above studies generally concluding that there is little evidence to suggest that wind farms negatively affect property values, it is nonetheless an issue that is raised frequently. VPELA notes that in terms of the planning consideration of an application to develop a wind farm, the impact on property values is an objection that can rarely be substantiated and one that is not considered to be a relevant planning consideration. Therefore, VPELA considers that until evidence can be produced to show a conclusive link between wind farms and a decrease in property values, this issue should not carry any weight in consideration of the merits of the application.

Broader economic benefits

While the development and operation of wind farms have positive and negative effects on local economies, it is noted that wind farms are presently the only source of renewable energy that can be economically deployed to satisfy forecast increases in energy demand in Victoria, and at the same time meaningfully decrease Victoria’s reliance on carbon-intensive electricity generation.

The long-term social and economic effects of climate change are well documented, and the priority of avoiding those adverse effects underpins international, Australian and Victorian climate change policy. To the extent that the deployment of wind energy partially satisfies (the forecast increase in electricity demand while at the same time reducing Victoria’s reliance on fossil fuels, these Victorian and Australia-wide social and economic benefits partially offset local benefits and costs.

Social impacts

Perception studies

Over the last decade, planning panels have been presented with community perception studies. The purpose of these studies has been to quantify community attitudes to wind farms, both throughout the broader Victorian community and in the local communities most affected by the wind farm project. In

very broad terms, these studies indicate that the majority of community members support wind farm development.

Wind farm opponents have attacked these perception studies, particularly because it tends to paint their opposition to the project as representing a minority community view. It is also the fact that some community members might support a wind farm proposal, while many more will not make a submission at all (implying either support or, at worst, a neutral view on the proposal).

From a social impact perspective, it is VPELA's view that these perception studies should be given little weight. Planning is not a popularity contest, and should focus on understanding the potential for a new wind farm project to create community anxiety and division, and to manage and mitigate the consequence of this.

Are wind farms different to other projects?

Any large scale development, whether in regional Victoria or elsewhere, is likely to attract supporters and detractors and, hence, create local community division.

Some planning panels, however, have expressed the view that there are qualitative differences between wind farms and other projects, which enhance and magnify the social division which a new wind farm project generates. The basis for this view is that wind farms are perceived by local communities to create 'winners' and 'losers' – the 'winners' being the participating landholders who derive off-farm revenue from the establishment of turbines on their properties, and the 'losers' being the owners and occupiers of adjoining and nearby properties. This is sometimes exacerbated by the fact there may be a group of landowners benefitting from the wind farm development in contrast to other planning applications where there is usually only one landowner benefitting directly.

Further, negotiations between the wind farm developer and participating landholders are, of necessity, confidential. It is only when the wind farm developer's interests in the land have been secured that it makes an investment decision to design and assess the project for the purpose of seeking planning permission for the project, and other members of the community then have their opportunity to comment and complain about the project. A common complaint from wind farm objectors is that they have been 'ambushed' by the wind farm proposal, which creates resentment toward participating landowners. Some planning panels have expressed the view that such impacts do not materialise for other types of infrastructure projects.

Another observation made by some panels is that rural communities are more vulnerable to such division than their urban counterparts. The panels which have expressed this view sought to distinguish between the social effects of contentious projects on communities in metropolitan Melbourne, and the same types of effects on small, rural communities.

While both of these views are debatable, it is VPELA's strong view that the planning system should encourage or require proponents to carry out an appropriate degree of stakeholder consultation, and implement measures to manage and address the social impacts of their project.

For example the landscape significance of an area needs to be considered when assessing a wind farm planning permit application. Such assessment should include reference to scenic quality, scarcity and uniqueness of the landscape, as well as recognition of values that people may place (or not place) on a particular landscape, and the degree of visibility on the landscape. VPELA considers that community values about a landscape affected by a wind farm should be explicitly examined and considered.

It should also be acknowledged that the planning process itself creates or embeds social division until the planning application has been determined. This is a direct consequence of giving members of the public an opportunity to comment and object on a planning application that affects them. However, most Victorian planning panels have focussed on local social division up to and during the planning process, with little consideration being given to the long-term social effects (if any).

This may partly be due to the fact that, to VPELA's knowledge, there is very limited data about the long-term social effects of wind farms after they have been constructed and started operating. Anecdotally however, some wind farms are understood to have been operating for several years in Victoria with limited or no community division or complaint, while over the last 18 months there has been considerable complaint by some members of a community about a fairly new wind farm.

Stakeholder consultation

Wind farm objectors typically complain that the proponent's stakeholder consultation has been deficient. This is sometimes – but not always - the case.

It must however be recognised that the primary purpose of stakeholder consultation is to inform local communities about the proposal, seek their comment on it, and enable a proponent to decide whether it can accommodate the wishes and concerns of the community before finalising its design and submitting it to the planning assessment process. Objectors, on the other hand, sometimes present the view that any stakeholder consultation is deficient unless the proponent has accepted and addressed all of their concerns. This is rarely possible for any project in any industry and, even where physically possible, may render the project economically non-viable.

The National Windfarm Guidelines contain recommended processes and guidelines for community consultation. The Victorian Wind Energy Guidelines also recommend that proponents engage and consult with local communities and other stakeholders in the project. These documents provide good guidance for proponents to engage in a reasonable and robust engagement with communities and

other stakeholders, and there really should be no reason for inadequate community consultation on wind farm projects.

Setbacks and compensation

The newly elected Victorian Government has a policy of requiring two kilometre separation distances between turbines and dwellings, and one kilometre separation distances between turbines and the boundary of non-stakeholder properties. However, the owners of those dwellings and adjoining properties can enter into agreements with the wind farm developer to waive the need for compliance with the setback distances.

This policy is yet to be implemented through the planning system, nor has it been tested by a planning application for a new wind farm project. VPELA acknowledges there are different views about the merit of this policy. Irrespective of this, it is unquestionably a precautionary approach to manage and address the impacts of wind farms on adjoining neighbours, although as noted above, the imposition of arbitrary setbacks may or may not be sufficient to address noise concerns in any particular case. It is equally unclear whether these policies, if implemented, will make any difference to the perceived social effects of wind farm projects in Victoria. To VPELA's knowledge, no research has been undertaken that analyses the potential impact of the policy for wind farms in Victoria.

Independent planning panels for three wind farms have recommended that the Victorian Government consider a policy that enables adjoining landholders to be compensated for the amenity impacts that wind farms have on their properties. This was seen by those panels as a means by which the effects on adjoining properties could be addressed, and thereby reduce the scope for the division between the perceived 'winners' and 'losers' referred to above.

Neither the Victorian Government nor, to VPELA's knowledge, any other State or Territory government has implemented a policy or legislation to give effect to this approach. The reasons for this are not known to VPELA, but it is important to carefully consider the implications of such an approach so that wind farms are not 'singled out' for special treatment over other forms of development that also have high visual and other amenity impacts or alternatively a precedent is set across the board for compensation for dis-amenity for all projects.

Improvements to the planning system

While the anecdotal indications are that communities habituate to change and most new wind farms have limited long-term social impacts, VPELA thinks it would be desirable for this anecdotal understanding to be tested by undertaking a social assessment of communities where wind farms have an operational track record. That data can help inform decisions about whether the planning system needs to be revised or adjusted to address the potential for long-term social division, or whether these concerns are overstated.

VPELA supports the Senate inquiry into the issue of the impact of wind farms and looks forward to the report and any action that may be taken following the report to clarify the issues and streamline the decision making process.